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SAMPLING METHODS FOR DETERMINING INSECT POPULATIONS IN STORED GRAIN

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Frequent sampling is necessary in grain work to judge the nature and extent of insect infestation and the need for control measures. In order that the results can be compared, the method of sampling should be reasonably consistent.

The methods suggested here have no relation to the official sampling method used in grain grading. Neither do they have any established status for research or survey purposes. The procedures have been developed over a period of years as means for obtaining information on insect infestations in stored grain.

Farm-type bins.--For farm-type bins up to 5,000 bushels, samples should be taken with the standard 5-foot grain probe from five locations--the center and about 1 foot from the wall at the sides of the bin in four different directions. For shallow bins, one sample from each location is sufficient. If the grain is deeper, from two to three samples must be taken from each location, using extensions on the probe so that samples can be taken from a vertical column at 5-foot intervals from the surface to the bottom of the bin. If information on the insect infestation in the surface grain is desired, a 5-foot probe sample is taken with the probe parallel to the grain surface, just deep enough to fill the probe, in the center of the bin.

It may be difficult to take the samples from the four quadrants of a round metal bin when the bin is overfilled. In such bins, the probe should be inserted in a slanting position, so that the bottom samples will be taken from the outside part of the bin.

Quonset huts.--In the sampling of quonset huts or large, rectangular wooden bins, additional samples are necessary, the number depending upon the size of the building and the depth of the grain. For the average quonset, 100 feet by 40 feet, samples are taken at 12 locations about 15 feet apart in two longitudinal rows evenly spaced between the two sidewalls. If the grain is about 10 feet deep, samples should be taken from the top and bottom 5 feet at each location. In addition, a surface sample should be taken from the center of the front and rear halves of the quonset.

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Elevator bins.--The sampling of grain in elevator bins is complicated by the depth of the grain and the difficulty of reaching the surface of the grain from the head-house floor. Unless special equipment is available to take probe samples from the top of the bin, or the elevator is equipped with an automatic sampler, the simplest method is to turn all the grain into another bin and take samples periodically from the grain stream with a "pelican" sampler. This method takes considerable time and is not always feasible.

Because infestation in elevator bins is most frequently found in the grain at the surface and the bottom of bins, the following method has been adopted for routine examinations.

A surface sample is taken from each bin by lowering an automatic sampling device on a rope to the grain level from the top of each bin. This device consists of a cylindrical container, the two halves of which are held open by springs. On contact with the grain, the two halves snap shut and capture about a gallon of grain. Accumulations of chaff and dust on the surface of the grain in elevator-type bins sometimes make it impossible to get a surface sample of grain in this manner.

Elevator bins that are filled to within a few feet of the top may be entered and sampled by using a standard grain trier. Samples should be taken from the four sides about 1 foot from the walls, and from the center. One surface sample should be drawn by inserting the probe in a horizontal position immediately below the grain surface.

A sample from the bottom of the bin is obtained by running the grain from the bin for one or two minutes, during which period five passes are made through the falling grain stream with a pelican grain sampler.

Examining samples.--For routine sampling for general survey purposes, all probe samples for any one bin, quonset, or elevator bin are combined into a composite lot, which is then cut down to a 1,000-gram sample with a Boerner grain divider. The sample can then be sifted and the insects counted. Rice weevils, granary weevils, and lesser grain borers can be classified as weevils, and all other beetles as bran beetles, as is done under the grain standards.

For more detailed records, as for research studies, the individual probe samples may be examined separately and the different species recorded independently.